

ABSTRACT

The grocery e-commerce industry continues to grow rapidly in line with increasing consumer demand. Users today expect a shopping experience that is relevant and tailored to their shopping habits. The main challenge in this industry is understanding the dynamic consumption patterns of users, which are influenced by temporal factors such as behavioral variations based on weekdays, weekends, or specific times of the day. Traditional recommender systems based on Collaborative Filtering methods, such as Singular Value Decomposition++ (SVD++), often fail to capture this temporal complexity, resulting in less relevant recommendations. To address this issue, we propose the TimeSVD++ method, which integrates time information into the model to assign greater weight to significant interaction patterns. This system is designed to provide more accurate, contextual, and personalized recommendations based on users' shopping habits. In the evaluation, we noticed that TimeSVD++ significantly outperforms the standard SVD++ model through five metrics, such as precision = 0.8239, recall = 0.7155, NDCG = 0.7060, MRR = 0.7498, and MAP = 0.8296. The evaluation results demonstrate that TimeSVD++ consistently outperforms the standard SVD++ model, showing significant improvements across metrics such as precision, recall, NDCG, MRR, and MAP.

Keywords: e-commerce grocery recommender system, time-based collaborative filtering, TimeSVD++.